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November 23, 1942

REPORT NO. 160a

A SECOND FISHERIES SURVEY OF HAMLIN LAKE, MASON COUNTY

by

C. J. D. Brown and Hugo Kilpela

Introduction

Location and Drainage

Hamlin Lake is located in the extreme west central part of Mason County, within a mile or two of Lake Michigan. Its more specific location is as follows: T. 19 N., R. 17 W., Secs. 5, 6, 7; T. 19 N., R. 18 W., Secs. 1, 2, 3, 4, 8, 9, 10, 15, 16, 17, 20, 21, 22, 27, 28, 33; T. 20 N., R. 17 W., Sec. 32. The lake is about 5 miles north of Ludington and may be reached by several excellent roads including the new state highway M. 116.

Hamlin Lake is within the Sable River drainage and receives all tributaries to that stream. The main Sable River enters the lake at the tip of the easternmost arm and leaves from the southwest to travel less than 2 miles where it enters Lake Michigan.

Acknowledgments

The map used in the present survey was made by the original survey party led by R. W. Eschmeyer in 1932 and although this map is inaccurate with respect to contours and bottom types, it has been possible to use it until a more accurate map can be prepared. Data taken on fish collections (Institute Report 160) made by the original survey party are also to be used in this report for comparison purposes. The recent survey* was carried out between June 26 and July 14, 1942.

Mr. Gwinn, superintendent of the Ludington State Park, supplied the survey party with information on operation of the dam at the outlet and

*The personnel of the survey party included: Hugo Kilpela, leader; R. D. Van Deusen, Pat Galvin and Stanley Lievense, assistants.

Mr. J. Barnhart allowed the party camping privileges and furnished some equipment while the party was working the eastern portion of the lake.

Creel census data on this lake were taken by the C.C.C. and Institute report No. 661 prepared by O. H. Clark includes the Hamlin Lake summaries.

Past and Present Use

Hamlin Lake and the Sable River were used extensively in lumbering operations. It was during this period that the original dam was built and the size of the lake increased. A considerable portion of the lake east of the narrows and most of the Bayous were formed at this time.

The lake has maintained a good fishing reputation even from early times. Today there is mixed opinion on the subject. Several "old timers" have given the usual "isn't what it used to be" statement of present fishing conditions. The fact remains however that the lake is still one of the most productive bodies of water in the state. Fishing operations by the survey party showed large numbers of legal fish of many species. Any decline noted by fishermen could easily be explained on the basis of changing fishing pressure which has increased several hundred percent in the past 20 years.

There is extensive resort and cottage development on practically all parts of the shore where conditions are at all suitable. There were at least 300 cottages, 5 hotels, 15 resorts and 13 boat liveries at the time of the survey (July 14, 1942). Further development is limited due to the marshy, stumpy ground or inaccessibility of the shore. Practically the entire lake east of Barnhart's to the inlet of Sable River is completely weed choked and inaccessible by boat except a narrow channel. It has been necessary to keep boat paths open by regular cutting operations with an underwater mowing machine. This weed choked condition also occurs in some of the bayous of the main lake to the south.

The public has access at two points on the upper lake. One is a U. S. Forest Service Camp site located near the inlet of the Sable River (T. 20 N., R. 17 W., Sec. 32). This is at the terminus of a road which crosses the Sable River near its mouth. The other is Victory Park (T. 19 N., R. 17 W., Sec. 6) located on the south shore of the east arm.

The large state park (Ludington State Park) situated on the northwest side of the main lake offers the best of camping facilities, picnic areas, etc., typical of the state park system.

Physical Characteristics

Geological Origin

Very little information is available on the geological origin and history of Hamlin Lake. It has been completely ignored in past geological

works on Michigan lakes. There is little doubt that the lake's original basin was formed by glacial action and that subsequent changes have altered greatly the original conditions. The location of the lake in almost pure sandy lake deposits makes its shore line on the west constantly subject to change because of the encroachment of wind blown sand.

Shape of the Basin and Extent of Drainage

The basin of Hamlin Lake is very irregular in outline. The lake proper is composed of two main parts; a south arm whose long axis extends in a north-south direction and an east arm with its long axis in an east-west direction. These two arms form a right angle the apex of which, known locally as the Narrows, points to the northwest. Many bayous and bays, some of considerable size, are scattered around the lake margin.

The drainage of the Sable River and Hamlin Lake includes approximately 275 square miles in the coastal region of eastern Lake Michigan. The major water supply of the lake comes from Sable River but numerous small inlets drain the adjacent countryside and enter the lake through the bayous.

The drainage topography of Hamlin Lake is slightly rolling. The low country surrounding the lake is fairly heavily wooded with a mixed stand of hardwoods and evergreens. Few cleared or cultivated areas exist about the lake and these are mostly marginal and unproductive.

Water Fluctuation

The most controversial matter concerning Hamlin Lake has been the establishment of a satisfactory water level. This of course has arisen because of the dam at the outlet. Natural water fluctuation would not be great but due to manipulation of the dam an annual fluctuation of 3-4 feet is the usual thing. At present the dam is operated by Mr. Gwinn, superintendent of Ludington State Park, in accordance with agreements set forth in the will deeding the said dam to the state. Each fall, beginning in early October, the water level is allowed to drop slowly until a point 3 feet below the summer level is reached. This decrease is ordinarily spread over two months time so that the lake does not reach its lowest level until about mid December.

In the spring after the ice is gone the lake is slowly raised to a prescribed level. The high level is usually reached by June 1. The management of the dam during 1941-42 as reported by Mr. Gwinn is as follows:

I. 1941 ..... Boards taken from the dam in the fall

October 14, 1941	One board all the way across	.....	6"
October 24, 1941	One board all the way across	.....	6"
November 10, 1941	Two boards all the way across	.....	12"
December 10, 1941	Two boards all the way across	.....	12"
		Total	36"

II. Spring 1942

March 24, 1942	Three boards installed all the way across when the ice went out. A raise of 18"
May 1, 1942	One board all the way across 6"
May 13, 1942	Two boards all the way across 12"
July 3, 1942	Took out four center boards on one row to drop water and replaced same 4 on July 11, 1942

The purpose of regulating the water level in Hamlin Lake is entirely to protect lake properties against ice damage and takes no cognizance of biological interests.

The dam, located in the Sable River about $\frac{1}{4}$ mile down stream from the outlet of Hamlin Lake, is about 14 ft. in height, constructed of concrete and has removable boards for regulating the water level. There is no fishway. Certain conservation-minded citizens have taken the responsibility of seining fish below the dam each spring and removing them to the lake above. This procedure has been in practice for a dozen or more years. A summary of these "rescue" operations during the past 6 years (1937-1942 incl.) is given below:

	Year					
Species	1937	1938	1939	1940	1941	1942
Rainbow trout	49	51	80	51	47	36
Brook trout	1	...	...	...	...	...
Brown trout	1	...	...	...	...	...
Walleye	281	307	301	302	381	282
Northern pike	30	26	48	48	40	12
Perch	231	112	196	65	...	...
Black bass	30	19	54	23	15	2
Rock bass	...	...	...	5	...	...
Speckled bass	312	22	...	...	...	...
Bluegills	2	2	38	...	...	...
Totals	937	539	717	494	483	332

The small number of fish added to Hamlin Lake by these operations certainly does not justify the effort involved.

Other Physical Characteristics

The area of Hamlin Lake is 5,070 acres according to the best maps now available. We believe this map is fairly accurate as far as the shore line is concerned. A new map will probably be prepared sometime within the next few years. A maximum depth of 86 feet was recorded by the recent survey party but this was only a chance sounding. Careful, systematic sounding will be necessary before accurate depth contours can be drawn. This point of greatest depth is near the center of the south portion of the lake. The lake has a shore line development of 3.5. This means that the shore line is 3.5 times longer than it would be if the lake were of the same size and perfectly round. This long shore line is indicative of high fish yield since it is caused by many productive bays and bayous.

The lake bottom of the shoal areas is composed almost wholly of sand and sand may be found at depths as great as 40 feet. Beyond the 15 ft. contour, however, the predominant bottom type is pulpy peat. There is evidence of much movement of sand on the bottom of the main or lower lake.

The water of Hamlin Lake is light brown in color and of about average transparency. A secchi disc was visible from 9 to 13 feet.

Wave and Ice Action

There can be little doubt but that very considerable wave and ice action are the usual thing at Hamlin Lake. Aside from reports there is evidence of ice action along the shores especially in lower Hamlin and considerable portions of the sand bottom on the shoals are almost constantly on the move. This condition, however, is not unique to Hamlin. As a matter of fact these molar agents are much more severe on Crystal Lake in Benzie County and Higgins Lake in Roscommon County. These two lakes just mentioned have even more real estate development than Hamlin and yet there is not the controversy concerning water level and ice damage. The answer is simple. Arrangements have been made whereby ice damage is slight. Boat houses are not built over the water and docks are removed at the end of each season.

Discussion of Physical Factors

Physical conditions are for the most part favorable to high productivity in Hamlin Lake. The many embayments, moderately clear water and suitable bottom give ample opportunity for plant growth and the production of fish. The wave and ice action are somewhat unfavorable but do not reduce plant areas as much as is common in many other large lakes in Michigan. As a matter of fact there is surprisingly little damage done to the biological constituents. The large, fairly rich drainage insures proper fertilization of the water and this is reflected in the extensive vegetation beds in the upper lake and bayous.

Temperature and Chemical Characteristics

There is probably never any significant thermal stratification in Hamlin Lake. At the time of the survey the temperature was almost uniform from the surface (72° F.) down to a depth of 86 feet (69° F.) at the bottom. This temperature condition precludes any possibility of the lake being suitable to cold water fish such as trout. On the other hand it insures the suitability of the entire lake for warm water species such as bass.

The surface water had 7.3 pp.m. and the bottom (86 ft.) 6.8 p.p.m. of oxygen. This is adequate for all fish life from top to bottom. Gill net operations in 50-70 ft. of water by the survey produced numerous game fish.

Hamlin Lake is moderately hard (Methyl orange alkalinity 108-128) and quite alkaline (pH 7.6-7.7). These conditions are extremely favorable to plants, fish-food and consequently game fish. Moderately hard, alkaline lakes are known to be more productive than soft, acid lakes.

Pollution

No pollution of any kind was observed on Hamlin Lake.

Biological Characteristics

Aquatic vegetation is one of the best indicators of lake productivity that is known. Where a large variety of aquatic plants thrive, there too, will be an abundance of fish food and fish.

Hamlin Lake has an abundance of plants. A total of 28 species was collected by the survey party. A summary of the species and their relative abundance is given in the following table.

Common name	Scientific name	Abundance
Water weed	Anacharis canadensis	Common
Water shield	Brasenia Schreberi	Sparse
Coontail	Ceratophyllum demersum	Common
Water star grass	Heteranthera dubia	Common
Duckweed	Lemna trisulca	Sparse
Water milfoil	Myriophyllum exalbescens	Common
Water milfoil	Myriophyllum sp.?	Common
Bushy pondweed	Najas flexilis	Common
White water lily	Nymphaea odorata	Common
Yellow water lily	Nuphar variegatum	Common
Large-leaf pondweed	Potamogeton amplifolius	Common
Variable pondweed	Potamogeton angustifolius	Common
Leafy pondweed	Potamogeton epihydrus	Common
Pondweed	Potamogeton Friesii	Common
Floating-leaf pondweed	Potamogeton natans	Abundant
Sago pondweed	Potamogeton pectinatus	Common
Clasping-leaf pondweed	Potamogeton Richardsonii	Abundant
White-stem pondweed	Potamogeton praelongus	Common
Flat-stem pondweed	Potamogeton zosteriformis	Abundant
Water marigold	Ranunculus longirostris	Abundant
Bullrush	Scirpus acutus	Common
Bur reed	Sparganium eurycarpum	Common
Bur reed	Sparganium sp.?	Common
Duck weed	Spirodela polyrhiza	Common
Cattail	Typha latifolia	Abundant
Bladderwort	Utricularia vulgaris	Common
Wild celery	Vallisneria spiralis	Common
Musk grass	Chara sp.?	Common

Upper Hamlin Lake has the greatest abundance of vegetation. The bayous of Lower Hamlin are likewise completely filled with a dense growth

of submerged plants. There are extensive cattail mats in upper Hamlin which are bordered on the lakeward side by such submerged species as Bladderwort, Myriophyllum, wild celery as well as the several species of pondweeds. Almost the entire bottom of upper Hamlin down to 15 feet is covered with a dense growth of vegetation.

In the lower lake, the plant beds are less extensive being confined to the shallow areas near shore and the bays and bayous.

Plant (weed) control has been in practice in the upper lake where strips have been cut to allow the passage of boats. Only a few channels can be kept open because of lack of equipment and time. In this part of the lake there is little chance that too many plants will be destroyed. On the whole the vegetation conditions in Hamlin Lake are very favorable to a high fish production.

Fish Foods

There is no doubt that Hamlin Lake produces a great abundance of fish-food organisms. Plankton (microscopic free-floating organisms) was abundant at the time of the survey and most surely is common to abundant throughout the year due to the high nutrient content of the water.

The larger food-organisms such as aquatic insects, snails, scuds, etc., are common to very numerous. Scuds and snails were abundant in the weed beds and midge larvae, mayfly nymphs, dragonfly nymphs, and caddis larvae were the most numerous of the aquatic insects. Forage fishes were fairly abundant in both the upper and lower lake. All in all, Hamlin lake may be considered as unusually rich in essential fish foods.

Fish

Hamlin has a rich fish population. There were 37 different species of fish actually collected by the survey party. Ten of these were game species, 17 forage species, 8 coarse species and 2 obnoxious species. A summary of the kinds of fish collected or reported is given in the following table. Stocking records are also included in this table. The fish in each category such as game, forage, etc., are arranged in the order of abundance. The first listed is the most abundant, etc.

Species of Fish - Hamlin Lake

Game Species	Stocking Records 1937-1941 inclusive	
1. Yellow perch	604 adults	9,000 fingerling
2. Bluegills	40 adults	84,000 fingerling
3. Largemouth bass	...	11,500 fingerling
4. Rock bass	5 adults	...
5. Pumpkinseed	...	...
6. Black crappie	334 adults	...
7. Northern pike	152 adults	...
8. Walleye	1,191 adults	715,000 fry

(continued)

Game Species (continued)	Stocking Records 1937-1941 inclusive	
9. Smallmouth bass	127 adults	2,000 fingerling
10. Muskellunge	...	...
11. Rainbow trout	Reported	231 adults
12. White bass	Reported	...
Forage Species		
1. Mimic shiner		
2. Bluntnose minnow		
3. Sand shiner		
4. Scaly Johnny darter		
5. Log perch		
6. Iowa darter		
7. Golden shiner		
8. Black-chin shiner		
9. Spot-tail shiner		
10. Menona killifish		
11. Brook stickleback		
12. Silverside minnow		
13. Black-nose shiner		
14. Mud minnow		
15. Great Lakes muddler		
16. Tadpole cat (madtom)		
17. Least darter		
Coarse Species		
1. Common sucker		
2. Brown bullhead		
3. Northern redhorse sucker		
4. Sheepshead		
5. Black bullhead		
6. Golden redhorse sucker		
7. Yellow bullhead		
8. Long-eared sunfish		
Obnoxious Species		
1. Long-nosed gar		
2. Dogfish		
3. Carp	Reported	

Creel Census

Aside from the general creel census data accumulated on Hamlin Lake in the past 12 years, there was an intensive census on this lake during the summer fishing season of 1939 and the winter season following (1939-1940). The intensive census is of recent enough date to give a fairly accurate picture of present fishing conditions. A summary of the results of the intensive census* of 1939-40 follows:

*O. H. Clark, 1941, Progress Report of Investigations of the Winter Fishing Problem on Several Southern Michigan "Bluegill Lakes." Institute Report No. 661.

	Summer		Winter	
Catch per hour	0.97		0.8	
Catch per fisherman	3.5		3.6	
Fishermen per day per acre	3.3		0.27	
Average number of fish caught per acre	11.52		0.97	
Species composition of catch	Per cent	Average size inches	Per cent	Average size inches
Largemouth bass	3.64	14.4	trace	13.3
Smallmouth bass	3.04	13.3	trace	18.2
Bluegill	45.86	8.1	79.61	8.1
Sunfish	6.19	7.4	1.07	6.8
Yellow perch	10.05	7.9	5.66	8.2
Black crappie	5.27	9.9	0.14	12.2
Rock bass	19.43	8.2	trace	10.1
Walleye	2.64	16.5	0.89	19.8
Northern pike	0.44	21.9	5.96	24.5
Bullhead	2.78	12.5	trace	12.8
Dogfish	0.14	20.4	2.27	20.5
Gar	trace	28.7	trace	21.8
White bass	trace	13.0	...	...
Red horse	trace	14.2	...	...
Sucker	trace	15.1	3.12	19.3
Sheepshead	0.29	20.1	trace	27.5
Muskellunge	trace	33.2	0.23	37.4
Rainbow trout	trace	16.7	...	...

Creel census data show the bluegill to be by far the most important constituent of the catch in both summer and winter. Rock bass is next common in the summer catches while northern pike are next in line for winter fishing. Summer catches of northern pike are very small. Perch which was first in abundance as judged from survey collections was third in abundance in the creel census for both winter and summer fishing. By and large, the abundance figures of collections agree fairly well with creel census figures. Complete agreement is not expected because it does not always follow that the most abundant fish is the most often taken by fishermen.

Growth Rate of Game Species

A study has been made on the growth rate of game species collected by the survey parties. A comparison will be made between the recent survey collections and those made 10 years previously. Both of these will also be compared to the tentative state averages prepared by W. C. Beckman (Institute Report No. 741).

Age	1932 Number of specimens	1932 Average total length inches	1932 Average weight ounces	1942 Number of specimens	1942 Average total length inches	1942 Average weight ounces	State average total length inches
Yellow Perch							
I	...	...	...	2	2.8	0.1	4.7
II	4	4.3	...	7	4.2	1.0	6.2
III	22	5.1	...	11	5.4	1.1	7.1
IV	15	7.4	...	9	6.0	1.6	7.8
V	15	8.3	...	14	7.3	2.9	9.4
VI	22	9.9	...	12	8.3	4.4	10.2
VII	1	9.5	...	14	8.8	5.3	10.4
VIII	2	10.5	...	2	10.4	8.6	11.3
IX	1	10.3	...	...	...	...	11.8
Largemouth Bass							
I	...	...	...	1	5.0	1.0	5.5
II	...	...	...	7	7.7	4.4	8.4
III	1	10.8	...	1	11.5	13.3	10.8
IV	...	...	...	2	13.7	23.0	12.1
V	...	...	...	7	15.0	30.0	13.3
VI	...	...	...	2	15.6	32.5	14.4
Smallmouth Bass							
III	...	...	...	3	12.2	15.0	10.7
IV	...	...	...	5	11.8	15.5	13.3
V	...	...	...	2	13.9	25.5	13.8
VI	...	...	...	2	15.5	34.5	15.2
VII	...	...	...	2	17.6	37.0	...
Bluegills							
II	...	...	...	2	4.1	0.7	4.3
III	...	...	...	9	5.9	2.4	5.6
IV	...	...	...	1	6.5	3.7	6.7
V	...	...	...	7	7.4	4.8	7.4
VI	...	...	...	10	8.0	6.9	7.8
VII	*13	8.2	...	38	8.3	7.5	7.9
VIII	*59	8.4	...	30	8.5	8.3	8.3
IX	*25	8.5	...	6	8.8	8.3	8.5
X	*2	8.8	...	1	8.9	9.5	...
Pumpkinseeds							
I	...	...	...	1	2.1	2.0	2.7
III	...	...	...	19	5.2	1.9	5.8
IV	...	...	...	20	5.9	3.0	6.4
V	...	...	...	15	6.6	4.2	6.8
VI	...	...	...	2	6.7	6.1	7.1
VII	...	...	...	2	7.3	4.9	7.8
VIII	...	...	...	1	8.9	10.4	...

(continued)

*Collection made in 1940.

Age	1932 Number of specimens	1932 Average total length inches	1932 Average weight ounces	1942 Number of specimens	1942 Average total length inches	1942 Average weight ounces	State average total length inches
Rock Bass							
I	...	...	...	1	3.7	0.5	3.2
II	...	...	...	2	4.0	0.8	4.3
III	...	...	...	23	5.4	2.1	4.9
IV	1	6.7	...	27	6.6	3.9	5.6
V	...	...	...	18	7.6	4.4	6.6
VI	1	9.4	...	10	7.8	5.8	8.3
VII	1	8.8	...	3	8.4	6.8	8.7
VIII	...	...	...	1	8.6	7.7	9.6
IX	...	...	...	2	8.9	8.6	10.3
X	...	...	...	1	9.0	9.4	10.8
Black Crappie							
I	...	...	...	5	4.2	...	5.3
II	...	...	...	22	6.7	1.8	5.9
III	...	...	...	12	7.6	3.9	8.7
IV	...	...	...	9	9.9	8.9	9.2
V	...	...	...	6	10.9	11.0	9.7
VI	...	...	...	5	11.1	13.4	10.1
VII	...	...	...	2	11.8	16.0	10.7
Northern Pike							
I	...	...	...	5	14.4	15.1	...
II	...	...	...	17	20.9	39.0	...
III	...	...	...	10	24.6	56.3	...
IV	...	...	...	2	28.5	73.0	...
Muskellunge							
II	...	...	...	1	23.3	78.0	...
Walleye							
I	...	...	...	2	9.0	3.4	...
IV	...	...	...	1	18.3	31.0	...
V	...	...	...	2	17.6	26.0	...
VI	...	...	...	6	18.1	30.5	...
VII	...	...	...	13	18.7	33.7	...
VIII	...	...	...	4	19.0	34.5	...
X	...	...	...	1	22.6	54.0	...

With the exception of yellow perch and pumpkinseeds the game fish in Hamlin Lake seem to equal or even slightly exceed the state average. The perch and sunfish are not enough below the state average to cause concern. We believe that in general the growth rate is remarkably good for an assemblage of species such as are found in this lake.

Natural Propagation

The abundance of young game fish is usually clear evidence of natural propagation. Large numbers of fry of largemouth bass, perch, bluegills, and sunfish were taken in the survey netting operations. A few northern pike and smallmouth bass were also taken. There was a complete absence of small walleye in collections.

It is believed that natural propagation facilities are adequate for all species with the possible exception of smallmouth bass and walleye pike. The lake has only very limited gravel and rubble beds which may account for the lack of natural propagation by these species.

Management Proposals

Designation of Lake

Hamlin Lake is at present in the Pike Lake category. The findings of the survey indicate that bass and bluegills are by far the most important fishery in the lake. In accordance with the law defining pike lakes Hamlin Lake should therefore be changed to the "all other lakes" class. We do not believe, however, that the present classification and the resulting regulations have any very harmful effects if any on the bass and bluegill populations.

Stocking

It is felt that all stocking operations in this lake are unjustified. There is certainly adequate spawning facilities for largemouth bass and all the pan fishes. The areas suitable for smallmouth bass are somewhat limited but no more so than the area of the lake favoring the growth and well being of this species. According to our present knowledge of walleye pike spawning, there is practically no place for this species to spawn. Our fish collection data bear out this fact in that no "young of the year" walleyes were taken in any of the fishing operations. In view of the excellent bass and bluegill fishing which is now enjoyed on Hamlin Lake, we are extremely doubtful about the advisability of encouraging walleye. Past experience has shown that in the majority of cases walleye and bass do not thrive together. Where walleye become established and reproduce the bass fishery deteriorates and may practically disappear. Northern pike must find considerable suitable spawning ground in the upper weedy part of this lake. There can be little doubt, however, that this is seriously interfered with by the fluctuation of the lake level.

Parasites and Predators

There is no serious incidence of either parasites or predators. Many of the fish have the "black spot" parasite but this does no harm to the fish and cannot infect man. No control is practicable.

The gar pike and dog fish are the only predators which are of consequence and we believe that these predaceous fish may have an important role in fish economy. Under ordinary circumstances evidence places them on the beneficial side of the leger in that they remove the sick or diseased fish and help to keep populations of pan fish in check. No control is recommended.

Shelter

Hamlin Lake is, for the most part, well supplied with shelter for fish. The upper lake with lush growth of vegetation and submerged logs and brush could not be improved. This same applies to the bayous and bay of the lower lake. Any improvement would have to be confined to a few shelters along the wind-swept shoal in water 10-20 feet in depth and we do not believe this is essential.

Regulation of Water Level

The present practice in regulating the water level of Hamlin Lake has already been described in a previous section of this report. The question now arises as to the best practice from the point of view of fisheries management. We are willing to concede that other interests such as the protection of property should receive consideration in the establishment of lake levels but are not in a position to balance this against the biological interests. In other words, we are only going to consider biological interests in making recommendations.

There is no doubt that a stable water level is more conducive to biological productivity than one which is allowed to fluctuate. Hamlin Lake would be better off from the fisheries point of view if a reasonably high level were maintained throughout the year.

This would improve the feeding and breeding grounds of most fish. The northern pike fishery would almost surely improve if the shallow grassy shores of the lake were covered with water in early spring—a condition which does not exist under present management. More extensive and desirable plant beds could become established in the lower lake if the shoal areas were not left high and dry each winter.

There would not be the danger of isolation and destruction of the fish in the bayous as exists under present practices.

As a matter of fact, not a single biological benefit can be cited as a result of water fluctuation. From the fisheries point of view a high stable water level would be decidedly beneficial.

Improvement of Spawning Facilities

As already pointed out the spawning facilities are already good for most species present in the lake. Pike spawning grounds could be created by the maintenance of a high stable water level.

INSTITUTE FOR FISHERIES RESEARCH

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